

## Transportation

This section discusses the current state of the transportation system surrounding Bear Creek Parkway and the results of technical analysis for the various Bear Creek Parkway Extension project alternatives. This work assesses the transportation impacts related to each of the alternatives in terms of overall traffic circulation, through traffic, parking, freight movement, non-motorized mobility, and short-term construction disruptions. The affected environment is described first, and includes a detailed overview of existing streets and traffic conditions in the study area. The transit environment (routes and headways) and non-motorized mobility are also described in the *Affected Environment* section. This is followed by a discussion of the impacts the various alternatives would have on the transportation system. This includes how the specific alignments would affect traffic distribution and circulation in the study area, and the positive or negative impacts on transit, freight, and non-motorized modes of traffic. Lastly, potential mitigation measures and unavoidable impacts are described to assess the short-term construction disruptions the various Bear Creek Parkway alignments would cause.

### ***Affected Environment***

The area of influence for this project is primarily comprised of the downtown area near or around Redmond Town Center. Key roadways in this study area include West Lake Sammamish Parkway to the west, 170<sup>th</sup> Avenue NE to the east, NE 90<sup>th</sup> Street to the north, and SR 520 to the south. Internal roadways that would also be impacted by the potential changes to Bear Creek Parkway include Redmond Way, Cleveland Street, Leary Way, and several north-south connector arterials such as 160<sup>th</sup> Avenue NE and 164<sup>th</sup> Avenue NE. Key selected arterials are described below and identified in Figure 3.12.

*Redmond Way* is a three- to five-lane major east-west arterial that lies north of Redmond Town Center. It is one-way westbound within the study area (160<sup>th</sup> Avenue NE to 168<sup>th</sup> Avenue NE) and two-way outside the study area. The posted speed limit is 30 to 35 mph and sidewalks are provided. Redmond Way is used as a primary westbound (WB) facility in the downtown area and forms one-half of the Redmond-Cleveland one-way couplet.

*Cleveland Street* is a two-lane eastbound (EB) arterial that forms the other half of the Redmond-Cleveland one-way couplet between 160<sup>th</sup> Avenue NE and 168<sup>th</sup> Avenue NE. The posted speed limit is 30 mph and sidewalks are provided on both sides.

*Leary Way* is a four-lane arterial with a posted speed of 35 mph. This roadway serves an important function by connecting the SR-520 ramps at West Lake Sammamish Parkway to the downtown area and other north-south connector roads. Paved shoulders are provided between West Lake Sammamish Parkway and Cleveland Street.

*Bear Creek Parkway* is a three- to five-lane arterial with one or two travel lanes in each direction and a median turn lane. Posted speeds are 35 mph and paved shoulders are provided. Turn pockets and traffic signals are also provided at the intersections with Leary Way and Redmond Way. The five-lane segment lies between Redmond Way on the east and 168<sup>th</sup> Ave NE, and primarily serves traffic to and from Redmond Town Center.

*West Lake Sammamish Parkway* is a five-lane north-south arterial that connects the SR-520 ramps to Leary Way and to points north and south of downtown. Sidewalks and paved shoulders are provided along specific segments. Posted speeds are 35 mph.

*160th Avenue NE* is a principal north-south arterial that connects north downtown to the Redmond Town Center area and provides access to communities farther north via NE 90th Street. The lane configuration varies depending on the segment in question, with one lane in each direction and turn lanes. The posted speed is 30 mph.

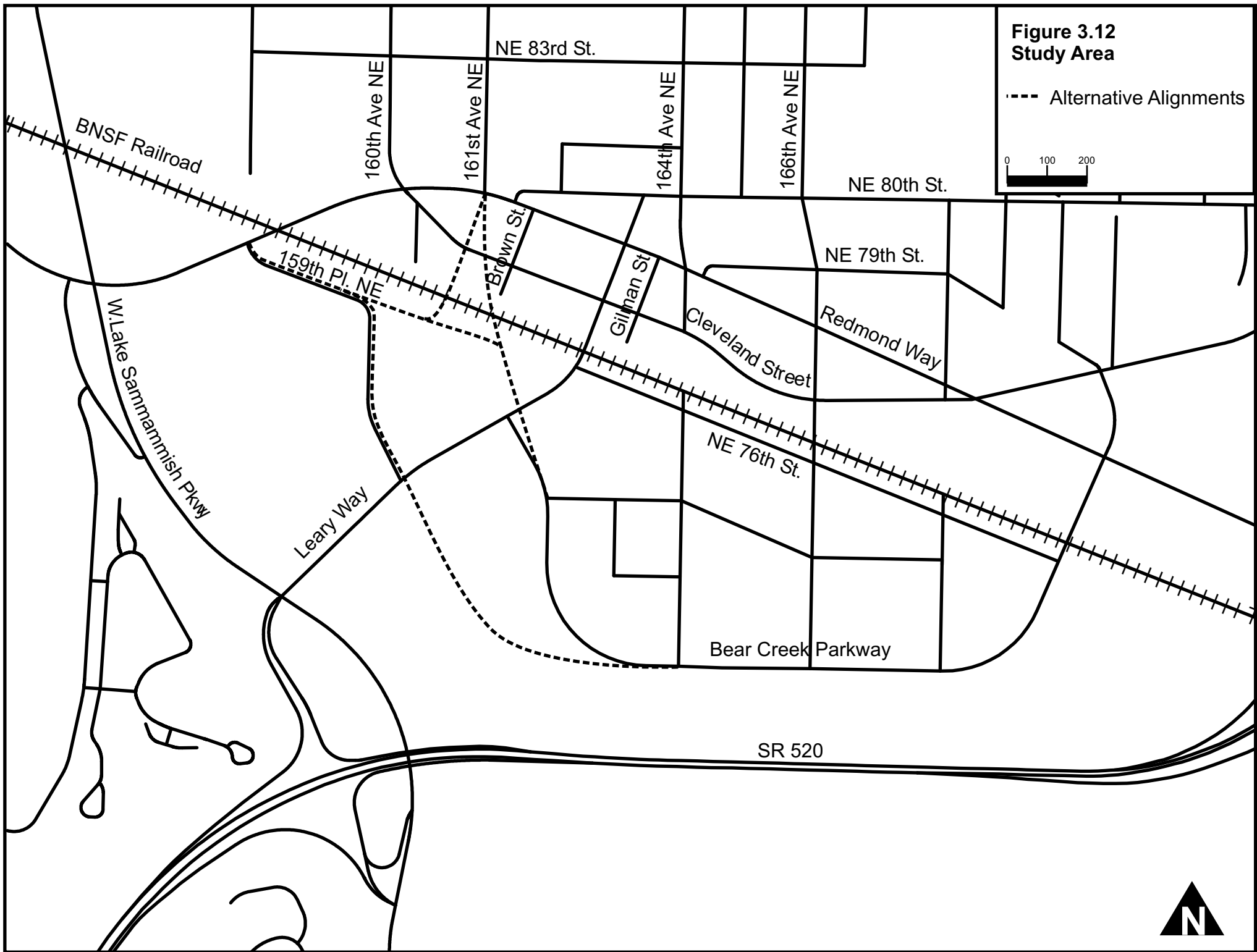
*161<sup>st</sup> Avenue NE* is a north-south collector arterial that provides local access and circulation. The arterial is generally configured as a three-lane section with one travel lane in each direction and a center two-way left turn lane. Posted speeds are 30 mph and paved shoulders or sidewalks are provided along most segments.

*164th Ave NE* is a north-south collector arterial that serves as one of the few key links for both local and regional trips to/from the downtown area. Two lanes are provided in each direction between Redmond Way and NE 85<sup>th</sup> Street. North of NE 85<sup>th</sup> Street, 164<sup>th</sup> Ave NE transitions into Woodinville-Redmond Road and narrows to a single lane in each direction. The posted speed limit north of Redmond Way is 35 mph and sidewalks exist from Redmond Way to NE 85<sup>th</sup> Street.

Table 3.13 lists the 34 intersections analyzed in the transportation study.

**Table 3.13**  
**List of Study Intersections**

Redmond Way & 159 <sup>th</sup> Place	NE 85 <sup>th</sup> St & 161 <sup>st</sup> Ave NE
Redmond Way & 160 <sup>th</sup> Ave NE	NE 85 <sup>th</sup> St & 164 <sup>th</sup> Ave NE
Redmond Way & 161 <sup>st</sup> Ave NE	NE 90 <sup>th</sup> St & 160 <sup>th</sup> Ave NE
Redmond Way & Leary Way	NE 90 <sup>th</sup> St & 161 <sup>st</sup> Ave NE
Redmond Way & 164 <sup>th</sup> Ave NE	NE 90 <sup>th</sup> St & 164 <sup>th</sup> Ave NE
Redmond Way & 166 <sup>th</sup> Ave NE	NE 83 <sup>rd</sup> St & 164 <sup>th</sup> Ave NE
Redmond Way & 168 <sup>th</sup> Ave NE	NE 80 <sup>th</sup> St & 164 <sup>th</sup> Ave NE
Redmond Way & Avondale Way	NE 76 <sup>th</sup> St & Leary Way
Redmond Way & 170 <sup>th</sup> Ave NE	NE 76 <sup>th</sup> St & 170 <sup>th</sup> Ave NE
Redmond Way & SR-520 WB	Bear Creek Pkwy & Leary Way
Redmond Way & SR-520 EB Ramps	NE 74 <sup>th</sup> St & Bear Creek Pkwy
Cleveland St & Leary Way	Bear Creek Pkwy & 164 <sup>th</sup> Ave NE
Cleveland St & 164 <sup>th</sup> Ave NE	Bear Creek Pkwy & 166 <sup>th</sup> Ave NE
Cleveland St & 166 <sup>th</sup> Ave NE	Bear Creek Pkwy & 168 <sup>th</sup> Ave NE
Cleveland St & 168 <sup>th</sup> Ave NE	159 <sup>th</sup> Place & Leary Way
Avondale Way & NE 79 <sup>th</sup> St	W Lk Sammamish Pkwy & Leary Way/ SR 520 WB Ramps
NE 85 <sup>th</sup> St & 160 <sup>th</sup> Ave NE	W Lk Sammamish Pkwy & SR 520 EB Ramps



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## Traffic Volumes

Existing peak-hour turning movement volumes for the various study intersections listed above were obtained from the City of Redmond. Data for the PM peak hour (the highest hour between 4 PM and 6 PM) was targeted, because this specific time period would likely represent the worst-case scenario in terms of vehicle congestion. Existing PM peak-hour traffic volumes for selected roadways in the study area are shown in Table 3.14. Detailed traffic volume data is provided in Appendix C.

**Table 3.14**  
**Existing PM Peak Hour Link Volumes**

Link #	Arterial	PM Peak Hour Volumes (vph)
1	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (EB)	N/A*
2	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (WB)	1,397
3	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (EB)	1,568
4	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (WB)	N/A*
5	Leary Way South of 159 <sup>th</sup> Pl. NE (NB)	1,515
6	Leary Way South of 159 <sup>th</sup> Pl. NE (SB)	1,290
7	Bear Creek Parkway West of 166 <sup>th</sup> Ave. NE (EB)	624
8	Bear Creek Parkway West of 166 <sup>th</sup> Ave. NE (WB)	370

\*existing one-way streets

## Traffic Operations

Existing traffic operations were evaluated to assess congestion levels and intersection-level delays for the various study intersections. The goal of this work was to develop a map of delays and Levels of Service for the study area, showing current peak-hour traffic conditions by intersection. Level of Service (LOS) is a general measure of congestion used to describe the operational characteristics of transportation elements such as highways, ramps, and in this case signalized intersections. The criteria and thresholds for signalized intersection LOS are based on a letter-grade system: LOS A represents low delays and LOS F represents high levels of delays that may indicate gridlock conditions.

The primary analysis tool used to evaluate congestion levels and intersection delay was a widely used, well-known analysis package known as Synchro/SimTraffic (version 5.0). Table 3.15 highlights the key results of this operational analysis in terms of existing approach delays and overall intersection congestion. SimTraffic delays and LOS are reported in Table 3.15 for the ten selected intersections identified in Figure 3.13.

As shown in Table 3.15, delays for the key intersections within the study area currently operate at a reasonable level of congestion. Although analysis results for some intersection movements indicate higher delays (LOS D to LOS E range), overall intersection congestion levels appear to be moderate during the PM peak hour.

**Table 3.15: Existing Delays and Level of Service (LOS)**

Node #*	Intersection	Delay	LOS
29	Redmond Way & Avondale Way	15.8	B
40	Redmond Way & 164 <sup>th</sup> Ave NE	10.4	B
59	W Lake Sammamish Pkwy & Leary Way	53.6	D
60	159 <sup>th</sup> Place NE & Leary Way	25.2	C
74	Redmond Way & Leary Way	18.1	B
75	Redmond Way & 161 <sup>st</sup> Ave NE	18.3	B
76	Redmond Way & 160 <sup>th</sup> Ave NE	21.8	C
188	Redmond Way & 159 <sup>th</sup> Place	16.9	B
197	Redmond Way & 170 <sup>th</sup> Ave NE	20.1	C
200	Bear Creek Pkwy & Leary Way	18.5	B
*Note: Node numbers refer to intersection numbers as reflected in the Synchro simulation model network.			

### Transit Service

King County Metro and Sound Transit (Express Bus) are the two major service operators that provide transit service within the study area. The primary Park-and-Ride lot in the study area is located on the south side of NE 83<sup>rd</sup> Street east of 161<sup>st</sup> Avenue NE. Redmond DART (Dial-a-Ride Transit) service is also provided at this Park-and-Ride.

Key transit routes within the study area serve a multitude of outlying communities such as Northgate, Kirkland, Bellevue, Downtown Seattle, the University of Washington, and Renton. These routes are listed below by service provider:

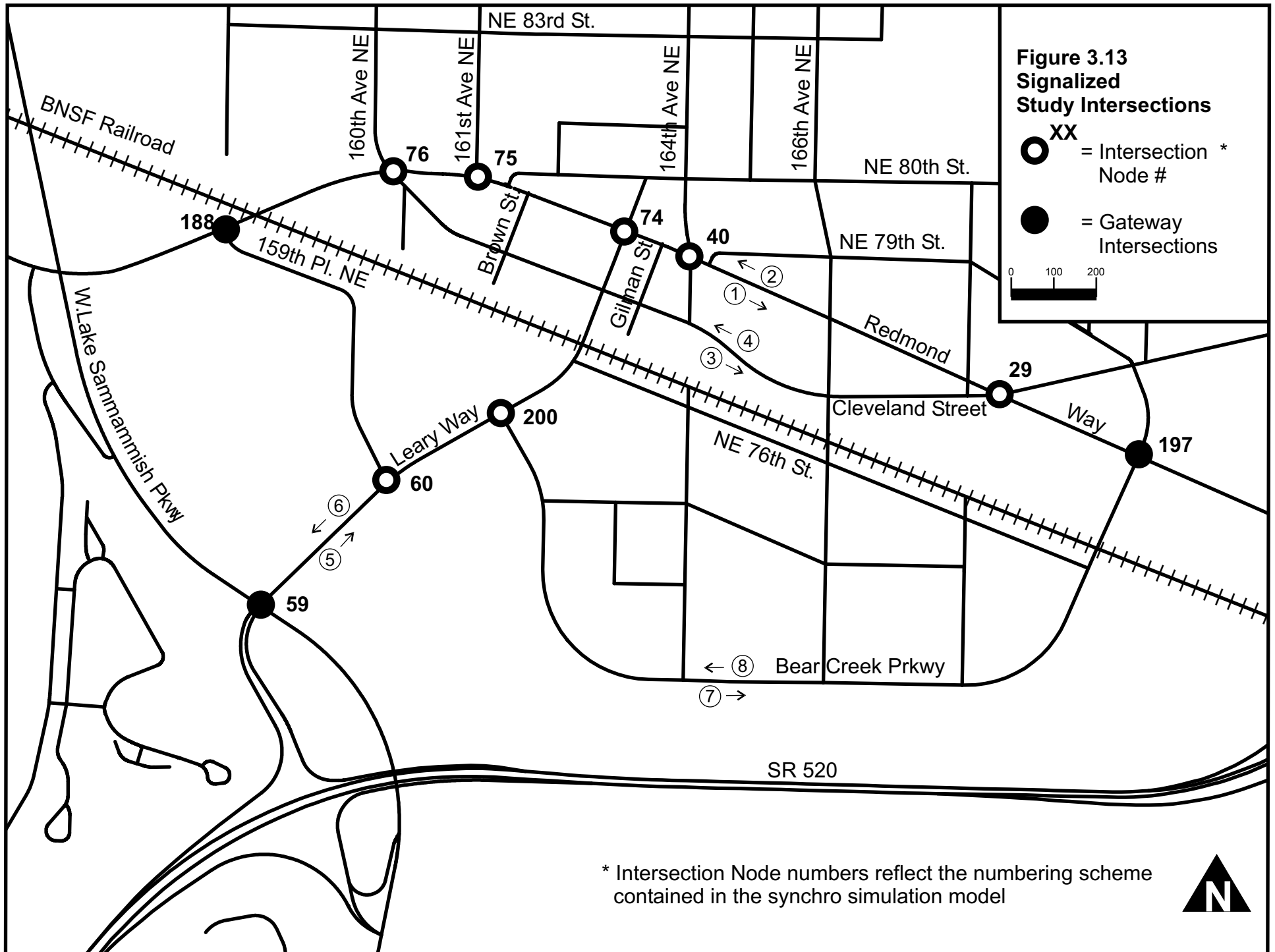
King County Metro Transit Routes: 220, 230, 232, 233, 245, 247, 249, 250, 251, 253, 254, 255, 265, 266, 268, 269, 291

Sound Transit Express Routes: 540, 545

Redmond DART Service: 922, 939

### Non-Motorized Transportation

Pedestrian traffic volumes within the study area are modest based on mid-week peak-hour field observations. Sidewalks are provided within the downtown core on key arterials such as Redmond Way and Cleveland Street. Only paved shoulders exist along peripheral arterials such as Bear Creek Parkway and West Lake Sammamish Parkway. However, non-motorized trails adjacent to these main roadways accommodate a large proportion of the pedestrian and bicyclist demand in the study area. Recent surveys by King County Parks have documented over 4000 users on the Sammamish River Trail on a summer weekend day. Summer weekday trail traffic was close to 2700 users. Based on field observations, peak-hour bicyclist traffic on project area roadways is moderate. Bike lanes are generally not provided along the majority of arterials, but sufficient width typically exists on paved shoulders for bicyclist travel. Study area arterials that do provide bike lanes include NE 85<sup>th</sup> Street from 154<sup>th</sup> Avenue NE to 166<sup>th</sup> Avenue NE, NE 90<sup>th</sup> Street from 160<sup>th</sup> Avenue NE to 164<sup>th</sup> Avenue NE, 160<sup>th</sup> Avenue NE from Redmond Way to NE 90<sup>th</sup> Street, and 164<sup>th</sup> Avenue NE from Redmond Way to NE 80<sup>th</sup> Street.



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## Transportation Impacts

Chapter 2 of this report describes the potential alternatives for the Bear Creek Parkway Extension project. As discussed in Chapter 2, for the transportation analysis the No Action Alternative assumed the implementation of all elements of the DTMP *except* the Bear Creek Parkway extension for the future design year. Therefore it is a “No Action” alternative for Bear Creek Parkway, but does assume the completion of other projects. Table 3.16 summarizes the specific transportation-related impacts for each of the various build alternatives in comparison to the No Action scenario. This table includes criteria elements (e.g., traffic circulation, transit service, and freight mobility) that highlight the project’s specific goals and objectives. Note that the No Action Alternative is not ranked because this environmental analysis is not specifically assessing its impacts. However, the text below will describe in general how the No Action is expected to operate and for most all of the transportation-related criteria, the build alternatives result in improved conditions. The following sections discuss the impacts of the various alternatives. Full presentation of the analysis data and definitions of the criteria rankings are included in Appendix C.

**Table 3.16: Transportation Impacts Evaluation Matrix (2022)**

Criteria (Measure Used))	No Action*	Alt 1	Alt 2	Alt 3	Alt 4
Traffic Circulation (LOS)	NA	●	●	◐	●
Through Traffic (travel time)	NA	●	●	◐	●
Transit Service (mobility and connectivity)	NA	◐	●	●	●
Non-Motorized (connectivity)	NA	○	◐	●	●
Parking (loss of parking)	NA	○	◐	◐	◐
Freight Mobility (delays and connectivity)	NA	●	●	◐	●
Construction Impacts (traffic disruptions)	NA	○	◐	◐	◐

\* Transportation rankings were developed for each build alternative in terms of how each performs against the future No Action Alternative. Therefore, the No Action served as the baseline for comparison and is not ranked. See the text for a discussion of the overall poor performance of the No Action Alternative.

### Key to Symbols:

○ More negative impact      ◐ Some negative impact      ◑ Little to no impact  
 ● Some positive impact      ● More positive impact

### No Action Alternative

The No Action Alternative represents a future (year 2022) base condition against which comparisons to the four proposed alternatives can be made. The No Action Alternative represents the future condition without the extension of Bear Creek Parkway. It does assume completion of the other major components outlined in the

*Redmond Downtown Transportation Master Plan Report* that are expected to be implemented by Year 2022. This includes conversion of the Redmond-Cleveland one-way couplet to a system of two-way streets, and widening Bear Creek Parkway from Leary Way east to Redmond Way (from three to five lanes). Changes to the Avondale Way and 168<sup>th</sup> Ave NE connections to Redmond Way are also included, and the following improvements are also assumed to be in place:

- SR-520 improvements - Addition of one HOV lane and one auxiliary lane in each direction between West Lake Sammamish Parkway and Redmond Fall City Rd (SR-202), and completing the interchanges at West Lake Sammamish Parkway and SR-202.
- 164<sup>th</sup> Avenue NE connection across the Burlington Northern Santa Fe (BNSF) Railroad right-of-way.
- 160<sup>th</sup> Avenue NE extension north of NE 90<sup>th</sup> Street, connecting to Redmond-Woodinville Road as identified in the RCP.

### **Traffic Volume Forecasts**

Traffic volumes for the No Action scenario were developed using the City of Redmond travel demand model based on the UFOSNET platform. Existing (2001) conditions forecast model volumes were first compared to existing (2002/03) traffic counts to re-calibrate the model to real-world data. Based on screenline-level comparisons, minor trip assignment modifications were made to minimize volume differences between the forecast model and the existing counts.

Following this calibration step, various land use and street network changes were incorporated into the forecast model to reflect a Year 2022 No Action condition. As discussed earlier, changes to the street network for the No Action Alternative were considerable for the core downtown area compared to existing conditions, and included conversion of the Redmond-Cleveland one-way couplet to two two-way streets and widening of Bear Creek Parkway to five lanes. Raw model turning- movement growth factors were generated from the forecast model for the various intersections targeted, and applied to the existing volumes to obtain intersection analysis volumes. Intersection-to-intersection volume balancing was again performed in preparation of the simulation analysis to ensure consistency between entry and exit volumes. . See Appendix C for a comparison of model results between existing conditions, the Future Baseline scenario, and each of the four build alternatives. Appendix C also includes model plots depicting network link volumes for each of these scenarios and alternatives.

Table 3.17 lists PM peak-hour volumes at selected key locations within the study area, compared to existing volumes at the same locations. This comparison indicates that traffic grows significantly throughout the network, and particularly along Bear Creek Parkway (which was widened from three to five lanes) and Leary Way. However, traffic volumes along Redmond Way and Cleveland Street are shown to decrease due to the reduced capacity and speeds resulting from converting the couplet to two-way operations and a corresponding diversion of trips to the widened Bear Creek Parkway.

### **Traffic Operations**

Traffic operations for the No Action Alternative, in terms of PM peak-hour vehicle delays, Level of Service, and overall traffic circulation, were evaluated using the Synchro/SimTraffic package described previously. Note that these analyses were conducted to establish a baseline against which to assess the potential

transportation impacts of the various Bear Creek Parkway Extension alternatives. The impacts of the No Action Alternative (that is, the impacts of the other elements of the DTMP), as compared to Existing Conditions, are not directly related to the Bear Creek Parkway Extension project so are not being assessed in this document as “project impacts”.

The results of the No Action Alternative analysis indicate substantially higher delays compared to the Existing Conditions scenario due primarily to the expected future growth in traffic to, from and through the downtown area. Results for ten (10) selected intersections are shown in Table 3.18. More detailed results for all network intersections can be found in the Appendix C.

**Table 3.17**  
**No Action (2022) PM Peak Hour Link Volumes**

Link #	Arterial	PM Peak Hour Volumes (vph)
1	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (EB)	800
2	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (WB)	525
3	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (EB)	510
4	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (WB)	310
5	Leary Way South of 159 <sup>th</sup> Pl. NE (NB)	2,750
6	Leary Way South of 159 <sup>th</sup> Pl. NE (SB)	1,875
7	Bear Creek Parkway West of 166 <sup>th</sup> Ave. NE (EB)	1,840
8	Bear Creek Parkway West of 166 <sup>th</sup> Ave. NE (WB)	1,075

**Table 3.18**  
**No Action (2022) Delays and Level of Service (LOS)**

Node #*	Intersection	Delay	LOS
29	Redmond Way & Avondale Way	48.8	D
40	Redmond Way & 164 <sup>th</sup> Ave NE	52.7	D
59	W Lake Sammamish Pkwy & Leary Way	50.9	D
60	159 <sup>th</sup> Place NE & Leary Way	21.4	C
74	Redmond Way & Leary Way	72.5	E
75	Redmond Way & 161 <sup>st</sup> Ave NE	55.1	E
76	Redmond Way & 160 <sup>th</sup> Ave NE	33.6	C
188	Redmond Way & 159 <sup>th</sup> Place NE	39.9	D
197	Redmond Way & 170 <sup>th</sup> Ave NE	75.6	E
200	Bear Creek Pkwy & Leary Way	26.8	C
*Note: Node numbers refer to intersection numbers as reflected in the Synchro simulation model network.			

As shown by these results, delays for the core intersections would generally fall into the LOS C to LOS E range, with three of the ten intersections expected to operate at LOS E. Specific results for the critical “gateway” intersections at the periphery (Redmond Way/159<sup>th</sup> Place NE, Redmond/170<sup>th</sup> Avenue NE, Leary Way/West Lake Sammamish Parkway) indicate high levels of congestion. This high level of gateway congestion would effectively “meter” traffic levels entering the study area and increase the duration of the peak period (i.e. peak spreading). Some other intersections also show relatively high levels of congestion, with some locations operating at LOS E (e.g., Redmond Way/Leary Way and Redmond Way/161<sup>st</sup> Avenue NE).

In terms of non-local, through traffic movements (i.e., vehicles that do not stop in the downtown area), travel times were calculated to estimate the time needed to travel between critical points at the edges of the study area. These paths included three east-west route combinations between the intersections of Redmond Way/Bear Creek Parkway and Redmond Way/159<sup>th</sup> Place NE using the following paths:

- Paths 1 and 2 – Via Bear Creek Parkway and 159<sup>th</sup> Place NE
- Paths 3 and 4 – Via Redmond Way
- Paths 5 and 6 – Via Cleveland Street

These paths and a summary of the No Action travel times are shown in Figure 3.14. Based on Figure 3.14, travel times ranged from 5 to 13 minutes for the east-west paths with the highest values occurring for the Cleveland Street paths. The lowest travel times were for the Bear Creek Parkway paths due to the posted speeds and absence of signals.

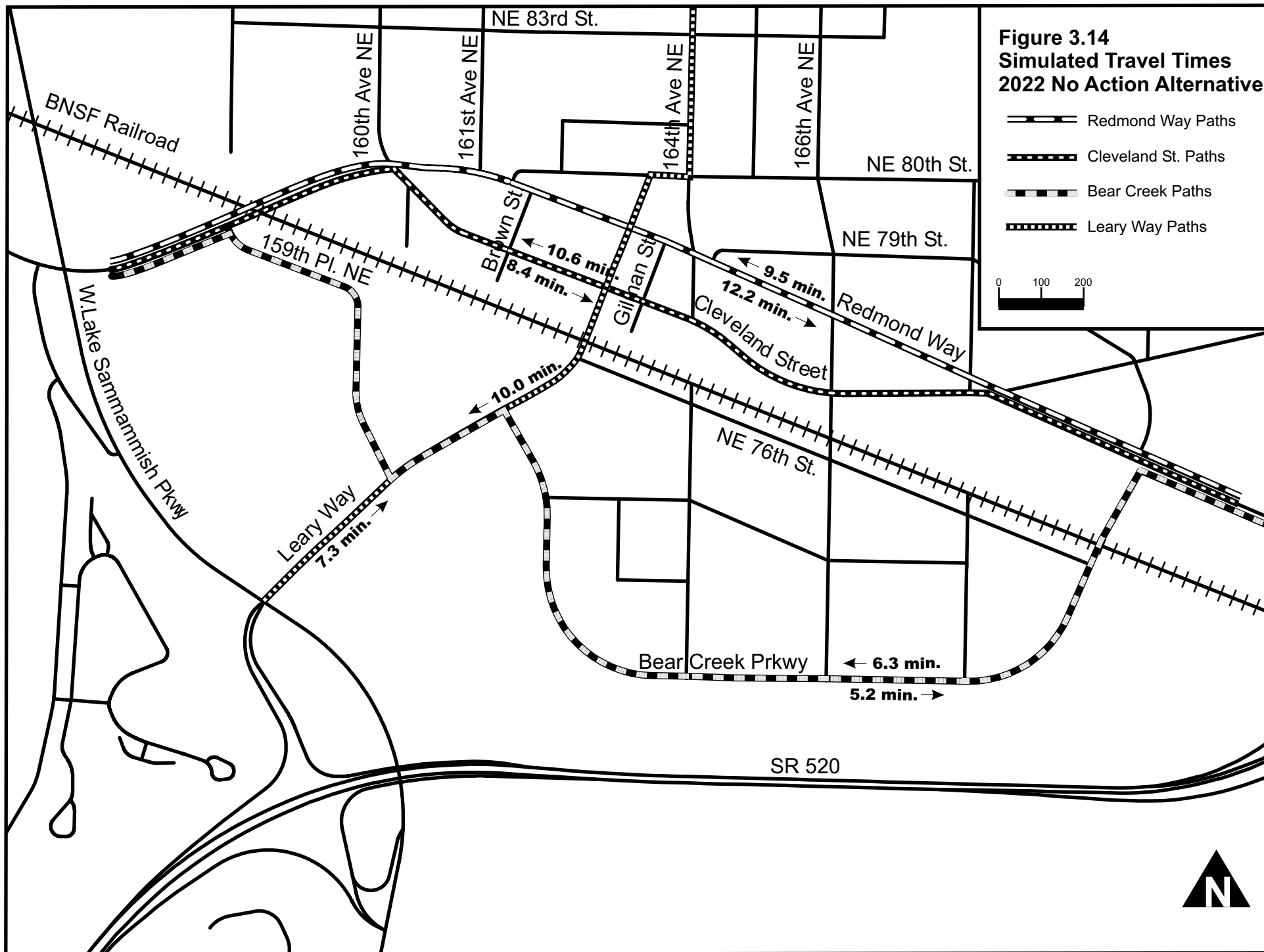
In addition to the east-west routes, a north-south route connecting the intersections of Leary Way/West Lake Sammamish Parkway with 164<sup>th</sup> Avenue NE/NE 90<sup>th</sup> Street was examined. This route, as shown in Figure 3.14, uses the following path:

- Paths 7 and 8 – Via Leary Way and 164<sup>th</sup> Avenue NE

Based on the Synchro Simulation model, calculated PM peak-hour travel times for this path were 7.3 minutes northbound and 10.0 minutes southbound.

### **Transit Service**

Bus routes and service hours under the No Action Alternative scenario would likely not be significantly affected despite the changes anticipated for the street network (particularly conversion of the one-way Redmond-Cleveland couplet). Traffic congestion would affect travel times through the study area, but existing transit routes to and from the downtown Park-and-Ride lot on NE 83<sup>rd</sup> Street would likely be maintained. Most routes would likely continue to operate along existing paths such as Redmond Way, Leary Way, and 161<sup>st</sup> Avenue NE. Changes to transit service would be made based more on long-range service plans rather than the expected reconfiguration of the downtown network. One exception may be the existing routes traveling along Cleveland Street, which would likely be shifted to the two-way Redmond Way arterial when the one-way couplet conversion is completed. Currently, Metro transit service for the downtown Park-and-Ride lot does not access SR 520 at the West Lake Sammamish Parkway interchange. This may be due to several reasons, one being the lack of a direct path between the Park-and-Ride lot and the SR 520 interchange with West Lake Sammamish Parkway. However, Sound Transit Route 545 does use the SR 520 interchange as a regional entry node.



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As a result of the conversion of Redmond Way and Cleveland Street to two-way operations in the No Action network, a slightly more direct route between the Park-and-Ride lot and SR 520 is possible (via 161<sup>st</sup> Avenue NE southbound, to Redmond Way eastbound, to Leary Way southbound) as compared to Existing Conditions. Based on results from the Synchro/SimTraffic simulation model, an estimated PM peak-hour travel time for this path in the No Action Alternative is calculated at 9.7 minutes southbound and 4.8 minutes northbound.

### **Non-Motorized Traffic**

Compared to existing conditions, non-motorized travel in the downtown Redmond area is improved with the No Action Alternative. The Redmond-Cleveland one-way couplet conversion would enhance non-motorized mobility by narrowing the north-south crossing distances and slowing traffic due to the two-way configuration.

Traffic volumes on these facilities are also expected to decrease as a result of the new Redmond Way and Cleveland Street configurations. These factors also apply to bicyclist mobility by reducing friction along key routes such as Redmond Way. Based on the RCP, a bicycle route (Class III bikeway) is proposed for Redmond Way east of 161<sup>st</sup> Ave NE and a bicycle path (Class I bikeway) is proposed for the BNSF Railroad corridor. These routes would enhance east-west bicyclist mobility and improve the pedestrian and cyclist experience in the downtown area. With the proposed 164<sup>th</sup> Avenue NE connection across the BNSF railroad, additional access to and from RTC is also provided.

### **Parking**

Despite changes to the street system, the parking inventory within the study area for the No Action Alternative would not noticeably change for most arterials. Currently, parking is not allowed on Bear Creek Parkway, so there would be no parking changes along that corridor. For Cleveland Street, the one-way to two-way conversion could maintain existing parking inventory levels on either side of the street because of the proposed configuration of a single lane in each direction with few (if any) turn lanes along its length. One side of Redmond Way would likely be converted to a travel lane to maintain a three-lane cross section in the downtown area. As such, moderate parking changes (as compared to Existing Conditions) could occur along Redmond Way (a potential loss of 20 to 30 on-street stalls). No other parking changes to east-west arterials are anticipated. North-south arterials such as 160<sup>th</sup> Avenue NE and 164<sup>th</sup> Avenue NE would generally be unaffected since few configuration changes are expected.

### **Freight Mobility**

Freight mobility and travel patterns through the downtown Redmond area in the No Action Alternative would likely change to some degree as a result of the changes in the roadway system. However, changes would depend on which freight routes are considered. For through routes that circumvent the downtown core, travel times may improve due to the widened Bear Creek Parkway. However, deliveries to and from the downtown core may be negatively affected due to the reduced capacity along Redmond Way and Cleveland Street and the signal changes required to accommodate the proposed two-way operations. For example, north-south freight movements along 164<sup>th</sup> Avenue NE or 160<sup>th</sup> Avenue NE may be impacted modestly due to the reconfiguration of Redmond Way and Cleveland Street.

## Year 2022 Alternative 1

Alternative 1 assumes a new Bear Creek Parkway (BCP) extension that would realign the western segment of BCP west of 164<sup>th</sup> Avenue NE to Leary Way and extend this new segment farther west along the 159<sup>th</sup> Place NE alignment connecting to Redmond Way. Please refer to Chapter 2 for a more detailed description of this alternative. The proposed extension would create a four-way intersection at Bear Creek Parkway/Leary Way and provide an additional connection for through traffic. Alternative 1 also includes the roadway elements discussed for the Baseline, such as conversion of the Redmond-Cleveland one-way couplet and widening Bear Creek Parkway from Leary Way to Redmond Way (from three to five lanes). Regional improvements to SR-520 and 160<sup>th</sup> Avenue NE (north connection) are also assumed in this analysis alternative.

### Traffic Volume Forecasts

Traffic volumes for the 2022 Alternative 1 scenario were again developed using the City of Redmond travel demand model based on the UFOSNET platform. The street network changes related to the Bear Creek Parkway Extension project were incorporated into the forecast model to reflect a Year 2022 Alternative 1 model run. Growth rates and turning-movement volume differences between the No Action Alternative and Alternative 1 were developed from the raw model output and applied to the No Action intersection volumes. Intersection-to-intersection volume balancing was again performed in preparation of the simulation analysis to ensure consistency between entry and exit volumes. Table 3.19 presents PM peak-hour volumes at selected key locations throughout the study area and compares them to Future Baseline volumes at the same locations. From this comparison, it is evident that Alternative 1 would attract additional traffic to Bear Creek Parkway and Leary Way, while diverting traffic away from Redmond Way and Cleveland Street.

**Table 3.19**  
**2022 Alternative 1 PM Peak Hour Link Volumes**

Link #	Arterial	Alt 1 Volumes	No Action Volumes
1	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (EB)	775	800
2	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (WB)	515	525
3	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (EB)	465	510
4	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (WB)	250	310
5	Leary Way South of 159 <sup>th</sup> Pl. NE (NB)	3,170	2,750
6	Leary Way South of 159 <sup>th</sup> Pl. NE (SB)	1,930	1,875
7	Bear Creek Pkwy West of 166 <sup>th</sup> Ave. NE (EB)	2,180	1,840
8	Bear Creek Pkwy West of 166 <sup>th</sup> Ave. NE (WB)	1,400	1,075

### Traffic Operations

Traffic operations for the 2022 Alternative 1 scenario were assessed using the Synchro/SimTraffic package. Analysis results compared to the No Action Alternative indicate noticeable changes in delays and congestion levels, with some intersections



experiencing higher delays and others showing delay reductions. Results for the ten (10) selected intersections are summarized in Table 3.20.

As shown by these results, delays for the core intersections would fall into the LOS C to LOS E range, with two of these ten intersections expected to operate at LOS E. Analysis results for the gateways (West Lake Sammamish Parkway/Leary Way, Redmond Way/159<sup>th</sup> Place NE, and Redmond Way/170<sup>th</sup> Ave NE) indicate slightly lower levels of congestion compared to No Action conditions. Overall, five of the ten intersections showed a ten-second or greater improvement in average intersection delay compared to No Action, while two showed a degradation of ten seconds or more.

**Table 3.20**  
**2022 Alternative 1 Delays and Level of Service (LOS)**

Node #*	Intersection	No Action		Alternative 1	
		Delay	LOS	Delay	LOS
29	Redmond Way & Avondale Way	48.8	D	34.0	C
40	Redmond Way & 164 <sup>th</sup> Ave NE	52.7	D	38.6	D
59	W Lake Sammamish Pkwy & Leary Way	50.9	D	54.3	D
60	159 <sup>th</sup> Place NE & Leary Way (BCP Extension)	21.4	C	70.6	E
74	Redmond Way & Leary Way	72.5	E	50.3	D
75	Redmond Way & 161 <sup>st</sup> Ave NE	55.1	E	20.7	C
76	Redmond Way & 160 <sup>th</sup> Ave NE	33.6	C	30.2	C
188	Redmond Way & 159 <sup>th</sup> Place NE	39.9	D	36.9	D
197	Redmond Way & 170 <sup>th</sup> Ave NE	75.6	E	56.1	E
200	Bear Creek Pkwy & Leary Way	26.8	C	45.3	D
*Note: Node numbers refer to intersection numbers as reflected in the Synchro simulation model network.					

Through-traffic travel times were calculated to estimate the time needed to travel between critical points in the study area. These travel times are summarized in Figure 3.15. As with the No Action Alternative, the basic travel paths included:

East-west routes connecting Redmond Way/Bear Creek Parkway and Redmond Way/159<sup>th</sup> Place NE:

- Paths 1 and 2 – Via Bear Creek Parkway and 159<sup>th</sup> Place NE
- Paths 3 and 4 – Via Redmond Way
- Paths 5 and 6 – Via Cleveland Street

North-south routes connecting Leary Way/ West Lake Sammamish Parkway and 164<sup>th</sup> Avenue NE/NE 90<sup>th</sup> Street:

- Paths 7 and 8 – Via Leary Way and 164<sup>th</sup> Avenue NE

Travel times for the east-west paths ranged from 4 to 10 minutes, with the highest values again occurring for the Cleveland Street paths. The lowest travel times were

for the Bear Creek Parkway paths, particularly due to the new connection west of Leary Way. Travel times for the Redmond Way paths fell in the middle of the travel time spectrum. Travel times for the north-south routes were roughly 10 minutes in both directions. In comparison to the No Action Alternative, four of the eight total routes showed a decrease (i.e., an improvement) in travel times by one minute or more, and one route showed degradation in travel time by one minute or more. Based on these results, travel times for through traffic (particularly east-west through traffic) would improve somewhat for Alternative 1 versus No Action conditions.

### **Transit Service**

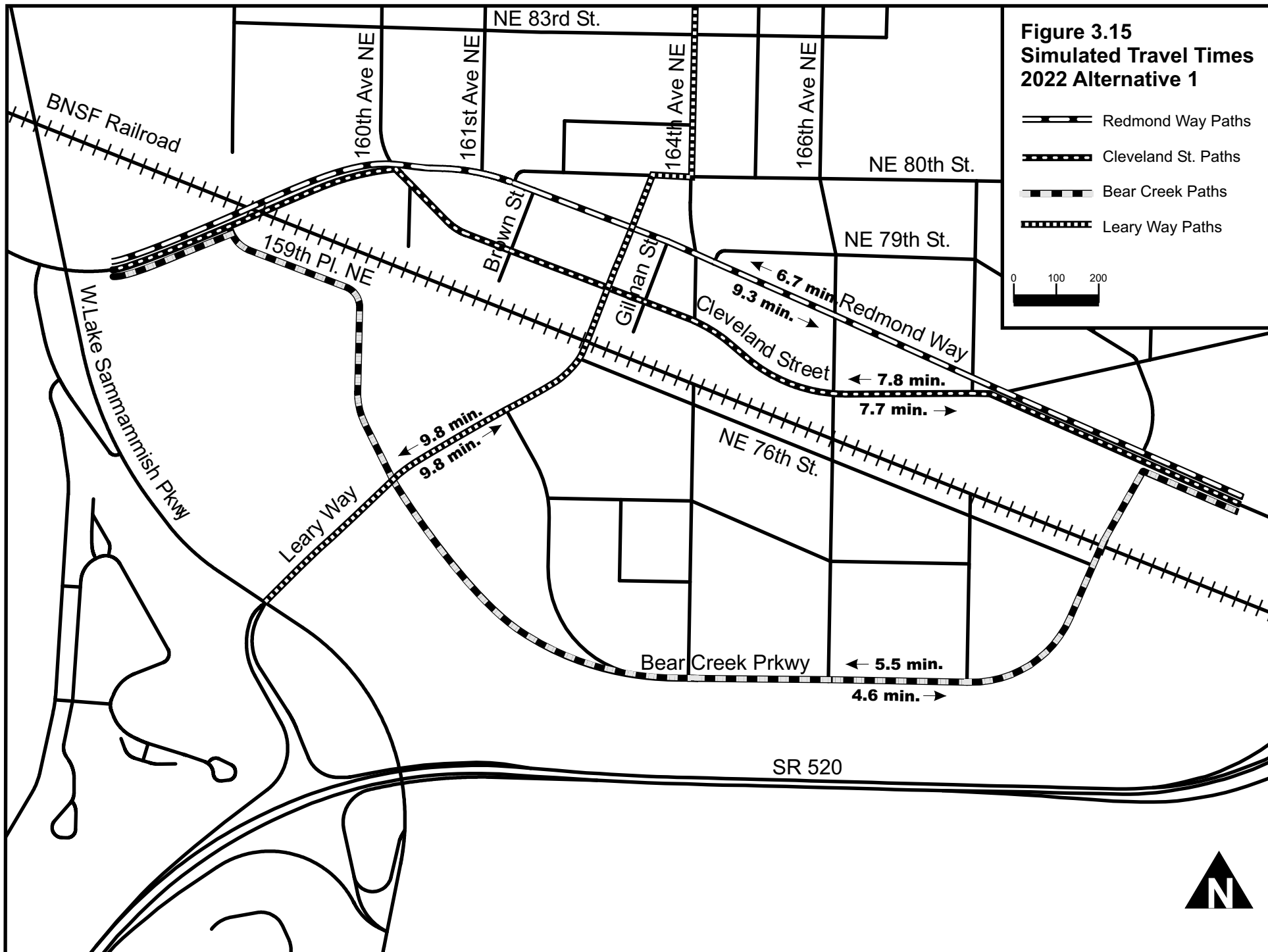
Transit routes and service hours under the Alternative 1 scenario would not be affected significantly compared to No Action conditions. Transit routes to and from the downtown Park-and-Ride lot on NE 83<sup>rd</sup> Street would not likely change from the No Action Alternative, and the majority of routes would continue to operate along existing paths such as Redmond Way, Leary Way, and 161<sup>st</sup> Avenue NE. As discussed previously, changes to transit service would be made based more on long-range service plans rather than the expected reconfiguration of the downtown network. In terms of potential transit time differences between Alternative 1 and the No Action Alternative for the critical path from West Lake Sammamish Parkway to the Park-and-Ride Lot at 161<sup>st</sup> Avenue NE & NE 83<sup>rd</sup> St (and the reverse direction), combined travel times for these two paths (northbound and southbound) would not be expected to increase or decrease by more than 90 seconds.

### **Parking Inventory**

The Alternative 1 alignment for Bear Creek Parkway would impact the study area parking inventory, primarily along 159<sup>th</sup> Place NE. The only major roadway change anticipated for Alternative 1 would be the new Bear Creek Parkway that connects to 159<sup>th</sup> Place NE. As such, parking impacts along corridors such as Redmond Way, Cleveland Street, and the various north-south arterials would be negligible in comparison to the No Action Alternative. However, parking along 159<sup>th</sup> Place NE would be removed due to the alignment of the five-lane BCP extension along 159<sup>th</sup> Place NE that could displace 20 to 25 parking spaces. Compared to the No Action Alternative, Alternative 1 would result in a relatively significant loss of parking.

### **Non-Motorized Traffic**

Alternative 1 non-motorized travel would generally be negatively impacted by the Bear Creek Parkway extension. One potential positive outcome of the Bear Creek Parkway extension may be lower traffic volumes on parallel routes such as Redmond Way and Cleveland Street. Pedestrians crossing these arterials may experience fewer delays and less friction versus the No Action Alternative. Similar benefits could arise for bicyclist mobility, by providing less friction along Redmond Way and Cleveland Street. However, due to the Alternative 1 alignment for the Bear Creek Parkway extension, the open space and trails west of RTC would be negatively impacted. Realignment of the Sammamish River Trail would likely be needed to maintain trail continuity through the impacted area, and this could potentially sever RTC from the Bear Creek Trail connections. Due to the fact that Alternative 1 would provide no new connections and would realign or eliminate recreation trails, the net impact would be a significant decrease in overall connectivity.



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## Freight Mobility

Alternative 1 would slightly affect freight mobility in the study area, compared to the No Action Alternative. This is primarily due to the creation of a stronger east-west “spine” via the Bear Creek Parkway extension. Freight-related traffic that bypasses the downtown area and uses Redmond Way to and from Kirkland and I-405 would benefit from the new extension. This is confirmed by the analysis results, which indicate lower travel times (versus No Action) along Bear Creek Parkway. Freight movements to and from the downtown core (i.e. local trips) would benefit in terms of the amount of traffic rerouted from local streets such as Redmond Way and Cleveland Street to the new Bear Creek Parkway extension. Overall, Alternative 1 would improve freight mobility by decreasing travel times and adding connectivity.

## Year 2022 Alternative 2

Alternative 2 assumes a new link is created between the existing Bear Creek Parkway /Leary Way intersection and the 159<sup>th</sup> Place NE segment west of Leary Way. 159<sup>th</sup> Place NE would essentially be extended to the east to run along the north edge of the wooded area and connect to Bear Creek Parkway at Leary Way. This new link between the existing 159<sup>th</sup> Place NE and Leary Way would create a four-way intersection at Leary Way/Bear Creek Parkway and serve as a more direct route for traffic circumventing the downtown core. Refer to Chapter 2 for a detailed description of this alternative. Alternative 2 also includes the roadway elements discussed for the No Action Alternative, such as conversion of the Redmond-Cleveland one-way couplet and widening of Bear Creek Parkway from Leary Way to Redmond Way (from three to five lanes). Regional improvements to SR-520 and 160<sup>th</sup> Ave NE are also assumed.

## Traffic Volume Forecasts

Traffic volumes for the 2022 Alternative 2 scenario were again developed using the City of Redmond travel demand model based on the UFOSNET platform. The street network changes related to the Bear Creek Parkway Extension were incorporated into the forecast model to reflect an Alternative 2 model run. Growth rates and volume differences were generated for the various intersections targeted. Intersection-to-intersection volume balancing was again performed in preparation of the simulation analysis to ensure consistency between entry and exit volumes. A summary of volumes for selected links is provided in Table 3.21. Similar to Alternative 1 in comparison to the No Action, Alternative 2 would attract additional traffic to Bear Creek Parkway and Leary Way (slightly less than Alternative 1), and would divert traffic away from Redmond Way and Cleveland Street.

**Table 3.21**  
**2022 Alternative 2 PM Peak Hour Link Volumes (vph)**

Link #	Arterial	Alt 2 Volumes	No Action Volumes
1	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (EB)	765	800
2	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (WB)	520	525
3	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (EB)	485	510
4	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (WB)	250	310
5	Leary Way South of 159 <sup>th</sup> Pl. NE (NB)	2,820	2,750
6	Leary Way South of 159 <sup>th</sup> Pl. NE (SB)	1,850	1,875
7	Bear Creek Pkwy West of 166 <sup>th</sup> Ave. NE (EB)	2,110	1,840
8	Bear Creek Pkwy West of 166 <sup>th</sup> Ave. NE (WB)	1,300	1,075

## Traffic Operations

Traffic operations for the 2022 Alternative 2 scenario were assessed using the Synchro/SimTraffic package. Analysis results compared to the No Action Alternative indicate noticeable changes in delays and congestion levels, with some intersections experiencing higher delays and others showing delay reductions. Results for the ten selected intersections are summarized in Table 3.22.

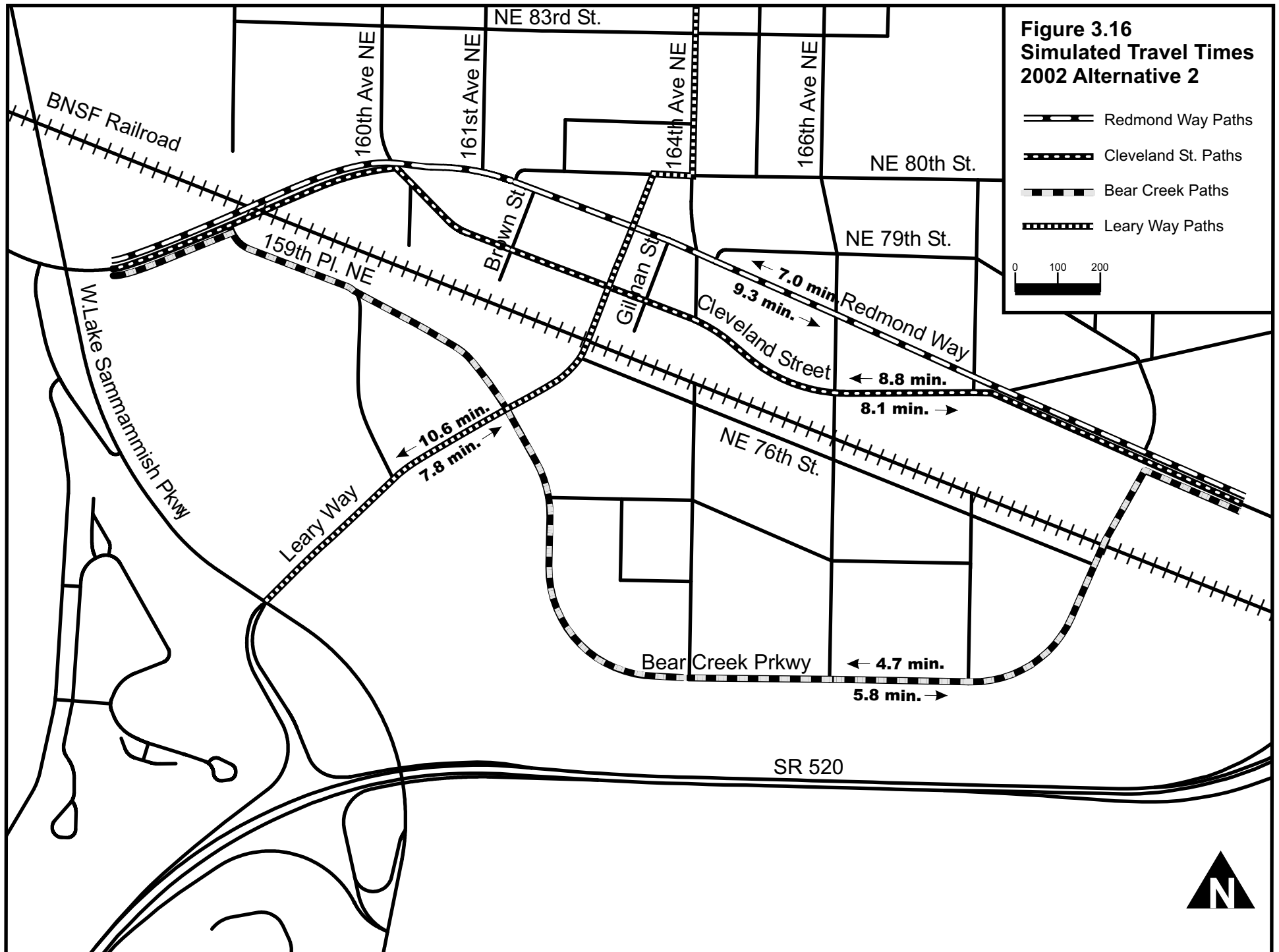
As shown in Table 3.22, delays are reduced at intersections along Redmond Way in Alternative 2 compared to the No Action Alternative. However, analysis results for the gateway intersection of Bear Creek Parkway and Leary Way show higher congestion levels compared to No Action conditions. This gateway congestion translates into spreading of the peak period and increased duration of evening commute-period congestion. Nonetheless, the overall circulation impacts for Alternative 2 compared to the No Action Alternative are generally positive (“some positive impact”) based on the net number of intersections (four) that show a delay reduction of ten seconds or more.

**Table 3.22**  
**2022 Alternative 2 Delays and Level of Service (LOS)**

Node #*	Intersection	No Action		Alternative 2	
		Delay	LOS	Delay	LOS
29	Redmond Way & Avondale Way	48.8	D	26.1	C
40	Redmond Way & 164 <sup>th</sup> Ave NE	52.7	D	48.4	D
59	W Lake Sammamish Pkwy & Leary Way	50.9	D	65.3	E
60	159 <sup>th</sup> Place NE & Leary Way	21.4	C	14.7	B
74	Redmond Way & Leary Way	72.5	E	50.7	D
75	Redmond Way & 161 <sup>st</sup> Ave NE	55.1	E	18.4	B
76	Redmond Way & 160 <sup>th</sup> Ave NE	33.6	C	29.4	C
188	Redmond Way & 159 <sup>th</sup> Place NE	39.9	D	40.4	D
197	Redmond Way & 170 <sup>th</sup> Ave NE	75.6	E	56.9	E
200	Bear Creek Pkwy & Leary Way	26.8	C	43.9	D
*Note: Node numbers refer to intersection numbers as reflected in the Synchro simulation model network.					

Through-traffic travel times were again calculated to estimate the time needed to travel between key points in the study area. The travel time results of basic travel paths in Alternative 2 are presented in Figure 3.16. Based on Figure 3.16, east-west travel times for Alternative 2 would be slightly lower than for the No Action Alternative, and north-south travel times would be similar.

Travel times for these east-west paths ranged from 5 to 11 minutes, with the highest values again occurring along Cleveland Street. The lowest travel times were for the Bear Creek Parkway paths, particularly due to the new roadway extension connection. North-south travel times ranged from 7 to 11 minutes. Overall, Alternative 2 would have a somewhat positive impact on travel times (versus No Action conditions), based on the net number of paths that show a reduction of one minute or more (four of eight paths show travel time reductions).



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### **Transit Service**

Bus routes and service hours under the Alternative 2 scenario would not change significantly from the No Action Alternative or Alternative 1 conditions. The only likely change would be a slight travel time improvement for routes traveling east-west, due to the improvements related to Bear Creek Parkway. Transit routes to/from the downtown Park-and-Ride lot on NE 83<sup>rd</sup> Street would not likely change from the No Action Alternative, and the majority of routes would continue to operate along existing paths such as Redmond Way, Leary Way, etc. As discussed previously, changes to transit service would be made based more on long-range service plans than on the expected reconfiguration of the downtown network. Nonetheless, based on critical travel times between West Lake Sammamish Parkway and the Park-and-Ride Lot at NE 83<sup>rd</sup> Street, the combined travel time improvement would be a net decrease of four minutes, which translates to some positive impact in transit mobility.

### **Non-Motorized Traffic**

Alternative 2 non-motorized travel would be modestly affected by the new 159<sup>th</sup> Place NE/Bear Creek Parkway connection. However, the potentially lower traffic volumes on parallel routes such as Redmond Way and Cleveland Street may reduce pedestrian friction versus the No Action Alternative. Similar improvements may occur for bicyclist mobility due to less friction along Redmond Way and Cleveland Street. The Alternative 2 alignment would not affect the open space and recreational trails west of RTC. The amount of space available for non-motorized travel along the riverfront would remain the same as in the No Action Alternative scenario.

The widened Bear Creek Parkway and its extension, along with the higher volumes expected to use it, may present somewhat of a barrier to non-motorized travel wanting to cross. This impact may offset any benefits realized due to lower volumes along Redmond Way and Cleveland Street in the downtown core area. As such, little to no net impacts to non-motorized trips would occur with Alternative 2.

### **Parking Inventory**

Alternative 2 would have minimal impact on the on-street parking supply compared to the No Action Alternative. On-street parking along 159<sup>th</sup> Place NE would likely be retained since the new route (to the north) would be the primary east-west connector. As such, 159<sup>th</sup> Place NE would remain a two- or three-lane secondary arterial. Only the westernmost portion of 159<sup>th</sup> Place NE would lose off-street parking. As such, some negative impact to the overall parking supply would occur with this alternative.

### **Freight Mobility**

Freight mobility within the study area would be slightly improved in Alternative 2 as compared to the No Action Alternative. Similar to Alternative 1, this would primarily be due to the creation of a stronger east-west “spine” via the Bear Creek Parkway extension. Freight-related traffic that bypasses the downtown area and uses Redmond Way to/from Kirkland and I-405 would benefit from the new extension in terms of peak-hour travel time savings. This is confirmed by the analysis results, which indicate lower travel times (versus No Action) along Bear Creek Parkway. Freight movements to and from the downtown core (i.e. local trips) would also benefit due to the significant amount of traffic rerouted from local streets (e.g., Redmond Way and Cleveland Street) to the new Bear Creek Parkway extension. Overall, these delay reductions would translate into some positive impact on freight mobility.

### Year 2022 Alternative 3

Alternative 3 assumes a new north-south Bear Creek Parkway extension between Bear Creek Parkway/Leary Way and 161<sup>st</sup> Avenue NE. Bear Creek Parkway would effectively be extended toward 161<sup>st</sup> Avenue NE to create a more direct route to Redmond Way/161<sup>st</sup> Avenue NE, while creating a new four-way intersection with Cleveland Street. Refer to Chapter 2 for a detailed description of the alternative. Alternative 3 would also include the roadway elements discussed for the No Action Alternative, such as conversion of the Redmond-Cleveland one-way couplet and widening Bear Creek Parkway from Leary Way to Redmond Way (from three to five lanes). Regional improvements to SR-520 and 160<sup>th</sup> Ave NE are also assumed.

### Traffic Volume Forecasts

Traffic volumes for the 2022 Alternative 3 scenario were again developed using the City of Redmond travel demand model based on the UFOSNET platform. The street network changes related to the Bear Creek Parkway Extension from Leary Way to 161<sup>st</sup> Avenue NE were incorporated into the forecast model to reflect a Year 2022 Alternative 3 model run. Model-generated turning movement growth factors and intersection volume differences (Alternative 3 vs. No Action) were produced for the various intersections targeted. Intersection-to-intersection volume balancing was again performed in preparation of the simulation analysis to ensure consistency between entry and exit volumes. A summary of traffic volumes for selected links is provided in Table 3.23. When comparing projected traffic patterns for Alternative 3 to the No Action Alternative, Alternative 3 would not significantly affect through traffic on Bear Creek Parkway or Leary Way, and would cause a slight increase in traffic on Redmond Way and Cleveland Street.

**Table 3.23**  
**2022 Alternative 3 PM Peak Hour Link Volumes (vph)**

Link #	Arterial	Alt 3 Volumes	No Action Volumes
1	Redmond Way East of 164 <sup>th</sup> Ave. N.E.	840	800
2	Redmond Way East of 164 <sup>th</sup> Ave. N.E.	545	525
3	Cleveland St. East of 164 <sup>th</sup> Ave. N.E.	495	510
4	Cleveland St. East of 164 <sup>th</sup> Ave. N.E.	345	310
5	Leary Way South of 159 <sup>th</sup> Pl. NE (NB)	2,780	2,750
6	Leary Way South of 159 <sup>th</sup> Pl. NE (SB)	1,800	1,875
7	Bear Creek Pkwy West of 166 <sup>th</sup> Ave. NE	1,775	1,840
8	Bear Creek Pkwy West of 166 <sup>th</sup> Ave. NE	1,065	1,075

### Traffic Operations

Traffic operations for the 2022 Alternative 3 scenario were again assessed using the Synchro/SimTraffic package. Analysis results compared to the No Action Alternative indicate increased delays and congestion levels. However, specific intersections also show delay reductions. Results for the ten selected intersections are summarized in Table 3.24.

**Table 3.24**  
**2022 Alternative 3 Delays and Level of Service (LOS)**

Node #*	Intersection	No Action e		Alternative 3	
		Delay	LOS	Delay	LOS
29	Redmond Way & Avondale Way	48.8	D	71.5	E
40	Redmond Way & 164 <sup>th</sup> Ave NE	52.7	D	58.3	E
59	W Lake Sammamish Pkwy & Leary Way	50.9	D	77.7	E
60	159 <sup>th</sup> Place NE & Leary Way	21.4	C	34.0	C
74	Redmond Way & Leary Way	72.5	E	50.1	D
75	Redmond Way & 161 <sup>st</sup> Ave NE	55.1	E	30.4	C
76	Redmond Way & 160 <sup>th</sup> Ave NE	33.6	C	37.8	D
188	Redmond Way & 159 <sup>th</sup> Place NE	39.9	D	53.4	D
197	Redmond Way & 170 <sup>th</sup> Ave NE	75.6	E	88.3	F
200	Bear Creek Pkwy & Leary Way	26.8	C	62.2	E
*Note: Node numbers refer to intersection numbers as reflected in the Synchro simulation model network.					

As shown in Table 3.24, six of the ten core intersections experience a delay increase of ten or more seconds in Alternative 3 vs. the No Action Alternative. Two key intersections that would experience reduced levels of delay (a decrease of ten seconds or more) are Redmond Way/Leary Way and Redmond Way/161<sup>st</sup> Avenue NE, which would benefit from the new connection between Bear Creek Parkway/Leary Way and Redmond Way/161<sup>st</sup> Avenue NE. Based on this, the impact of Alternative 3 on traffic circulation is considered moderately negative.

Through-movement travel-times are shown in Figure 3.17. These were again calculated to estimate the time needed to travel between critical points in the study area.

Travel times for the east-west paths ranged from 6 to 19 minutes, with the highest value again occurring on Cleveland Street. The lowest travel times were found along Bear Creek Parkway. However, these travel times were longer than under the No Action Alternative. The only east-west route where this alternative would result in travel time savings vs. the No Action Alternative is Redmond Way (EB). At this location, north-south times were roughly 6 to 7 minutes and showed some improvement (travel time reduction) vs. the No Action Alternative due to the new connection to/from 161<sup>st</sup> Avenue NE. Note that the north-south travel times reflect the use of the new 161<sup>st</sup> Avenue NE connection. In terms of the net number of paths that would show changes in travel time, a total of two net paths would increase by one minute or more, which translates into some negative impact for through traffic.

### **Transit Service**

Transit routes and service hours under the Alternative 3 scenario would be noticeably improved by the new connection between Bear Creek Parkway and 161<sup>st</sup> Avenue NE,

allowing a more direct connection to and from the downtown Park-and-Ride lot on NE 83<sup>rd</sup> Street. However, most routes continuing to operate along existing paths such as Redmond Way, Leary Way, and 161<sup>st</sup> Avenue NE may be impacted by the increased congestion and increased travel times during the PM peak hour. As discussed previously, changes to transit service would be made based more on long-range service plans rather than the expected reconfiguration of the downtown network. Combined travel times for the critical paths between West Lake Sammamish Parkway and the Park-and-Ride lot at 161<sup>st</sup> Ave NE/NE 83<sup>rd</sup> Street show a reduction of approximately 5.7 minutes for Alternative 3 vs. the No Action Alternative. This translates to a significant positive impact in terms of transit mobility and access to the Park-and-Ride lot.

### **Non-Motorized Traffic**

Non-motorized travel would be modestly affected in Alternative 3 by the new 161<sup>st</sup> Avenue NE/Bear Creek Parkway connection. However, lower traffic volumes on routes parallel to Bear Creek Parkway such as Redmond Way and Cleveland Street would reduce non-motorized delays and reduced friction when compared to the No Action Alternative. The new connections would also provide a more direct path to and from Downtown Redmond destinations with new sidewalks and shorter crossing distances. Similar improvements could occur for bicyclist mobility by reducing friction along Redmond Way and Cleveland Street.

The Alternative 3 alignment would not affect the open space and trails west of RTC and would provide another pedestrian connection to the BNSF Railroad right-of-way. The amount of space available for non-motorized travel would remain roughly the same as under the No Action Alternative.

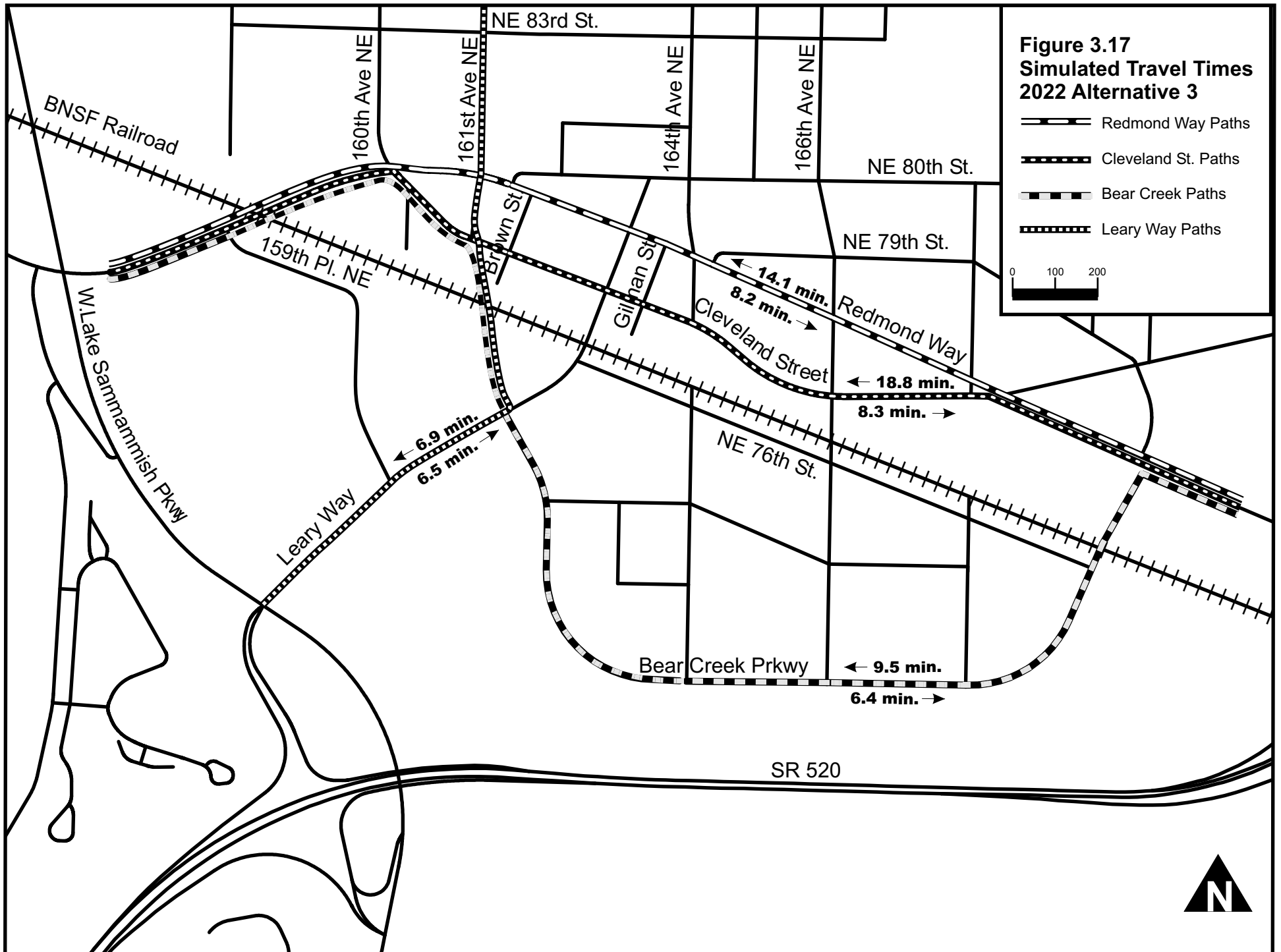
Based on these factors, Alternative 3 would noticeably improve the non-motorized connectivity and would have little to no negative impact on the existing trail system.

### **Parking**

Alternative 3 would generally not affect parking within the study area. Compared to the No Action Alternative, the only losses in on-street parking are foreseen in the expansion of 161<sup>st</sup> Avenue NE to a five-lane section to accommodate traffic demand for that connection. As such, parking impacts along corridors such as Redmond Way, Cleveland Street, and the various north-south arterials would be negligible. The overall impact of Alternative 3 on parking would be considered minor to negligible.

### **Freight Mobility**

Freight mobility through the study area would not be affected noticeably in Alternative 3 compared to the No Action Alternative, despite to the lack of a well-defined east-west connection. Higher congestion levels in the study area (based on the traffic analysis results) would generally impede freight movement and circulation, especially during peak traffic periods. However, the new connection to 161<sup>st</sup> Avenue NE from Bear Creek Parkway would counteract the added delays by providing a more efficient route to potential north-south freight routes. Based on this, little to no impact on freight mobility is expected to occur with Alternative 3 as compared to the No Action Alternative.



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## Year 2022 Alternative 4

The roadway network for Alternative 4 combines the basic elements of Alternatives 2 and 3, and includes an east-west connection via a new Bear Creek Parkway extension and a north-south connector between the Bear Creek Parkway extension and 161<sup>st</sup> Avenue NE. 159<sup>th</sup> Place NE would extend eastward to meet the new Bear Creek Parkway extension, as in the Alternative 2 scenario. As a result of these network components, new signals would be added along the Bear Creek Parkway extension at 159<sup>th</sup> Place NE and 161<sup>st</sup> Avenue NE. Refer to Chapter 2 for a detailed description of the alternative. Alternative 4 would also include long-range regional improvements and the roadway elements discussed for the Baseline Alternative, such as conversion of the Redmond-Cleveland one-way couplet and widening Bear Creek Parkway from Leary Way to Redmond Way (from three to five lanes).

### Traffic Volume Forecasts

Traffic volumes for the 2022 Alternative 4 scenario were again developed using the City of Redmond travel demand model based on the UFOSNET platform. The street network changes related to the new Bear Creek Parkway Extension and the 161<sup>st</sup> Avenue NE connection were incorporated into the forecast model to reflect a Year 2022 Alternative 4 model run. Raw model turning-movement growth factors and volume differences were applied to the No Action Alternative intersection volumes. Intersection-to-intersection volume balancing was again performed in preparation of the simulation analysis to ensure consistency between entry and exit volumes. Table 3.25 summarizes the peak-hour volumes for selected key links. In comparison to the No Action Alternative, Alternative 4 would have similar results as Alternatives 1 and 2 in that it attracts additional traffic to Bear Creek Parkway and Leary Way, and diverts traffic away from Redmond Way and Cleveland Street. The amount of change on these facilities would be closer to Alternative 2 and slightly less than for Alternative 1.

**Table 3.25**  
**2022 Alternative 4 PM Peak Hour Link Volumes (vph)**

Link #	Arterial	Alt 4 Volumes	No Action Volumes
1	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (EB)	775	800
2	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (WB)	525	525
3	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (EB)	475	510
4	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (WB)	280	310
5	Leary Way South of 159 <sup>th</sup> Pl. NE (NB)	2,870	2,750
6	Leary Way South of 159 <sup>th</sup> Pl. NE (SB)	1,940	1,875
7	Bear Creek Pkwy West of 166 <sup>th</sup> Ave. NE (EB)	2,060	1,840
8	Bear Creek Pkwy West of 166 <sup>th</sup> Ave. NE (WB)	1,260	1,075

### Traffic Operations

Traffic operations for the 2022 Alternative 4 scenario were assessed using the Synchro/SimTraffic package. Analysis results compared to the No Action Alternative indicate a noticeable reduction in delays and congestion levels, with the exception of the West Lake Sammamish Parkway /Leary Way intersection that does experience increased delays. Table 3.26 summarizes the results for the ten selected intersections.

**Table 3.26**  
**2022 Alternative 4 Delays and Level of Service (LOS)**

Node #*	Intersection	No Action		Alternative 4	
		Delay	LOS	Delay	LOS
29	Redmond Way & Avondale Way	48.8	D	21.9	C
40	Redmond Way & 164 <sup>th</sup> Ave NE	52.7	D	37.4	D
59	W Lake Sammamish Pkwy & Leary Way	50.9	D	62.1	E
60	159 <sup>th</sup> Place NE & Leary Way	21.4	C	16.2	B
74	Redmond Way & Leary Way	72.5	E	28.9	C
75	Redmond Way & 161 <sup>st</sup> Ave NE	55.1	E	32.6	C
76	Redmond Way & 160 <sup>th</sup> Ave NE	33.6	C	29.4	C
188	Redmond Way & 159 <sup>th</sup> Place NE	39.9	D	22.5	C
197	Redmond Way & 170 <sup>th</sup> Ave NE	75.6	E	54.7	D
200	Bear Creek Pkwy & Leary Way	26.8	C	32.7	C
*Note: Node numbers refer to intersection numbers as reflected in the Synchro simulation model network.					

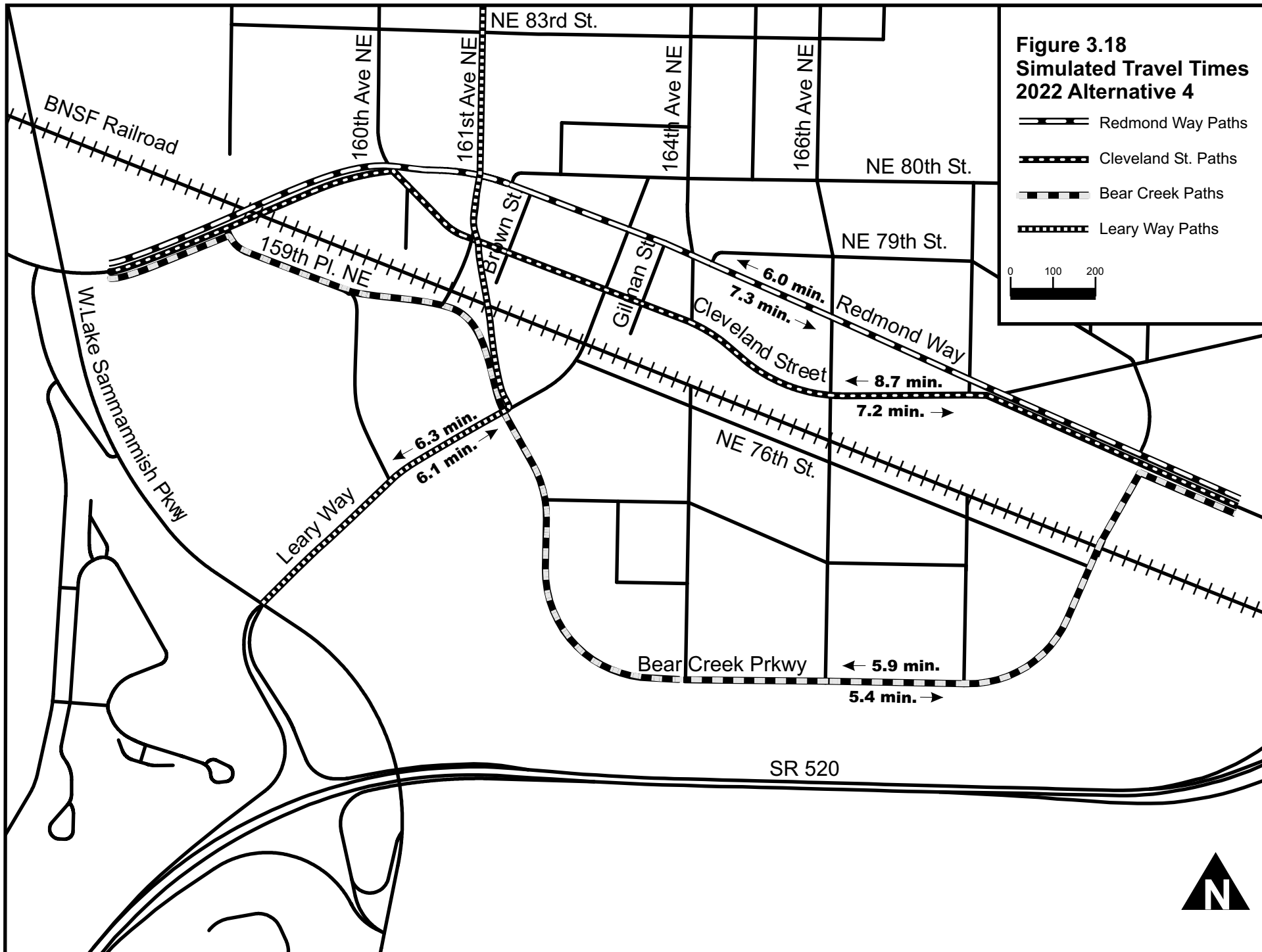
The results indicate that delays for six of the ten intersections would be reduced by 10 seconds or more, and delays for one location would increase by the same range. This translates to a significant overall improvement in traffic circulation. Figure 3.18 shows through-movement travel times for the selected east-west and north-south paths between critical points.

Travel times for the east-west paths ranged from 5 to 9 minutes, with the highest values again occurring on Cleveland Street. The lowest travel times were found along Bear Creek Parkway and were similar to the No Action Alternative. Travel times along Redmond Way and Cleveland Street were generally lower in Alternative 4 than for the No Action Alternative. North-south paths also show some improvement compared to No Action, with the northbound path reduced from 7.3 minutes (No Action) to 6.1 minutes (Alternative 4) and the southbound path reduced from 10.0 minutes to 6.3 minutes. The north-south improvements are likely attributed to the additional connection provided by the Bear Creek Parkway extension to 161<sup>st</sup> Avenue NE (north-south travel times reflect use of this new route). Overall, six of the total eight travel time paths showed reductions of one minute or more, while two of the paths showed little change. This translates to a significant positive impact for through movements.

### **Transit Service**

Bus routes and service hours under the Alternative 4 scenario would have the potential to change noticeably from the No Action Alternative. A potential benefit would be a slight travel time improvement for routes traveling east-west due to the improvements related to Bear Creek Parkway. Transit routes to and from the Park-and-Ride lot on NE 83<sup>rd</sup> Street could benefit from the new north-south connection.





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However, similar to the No Action Alternative, the majority of routes would continue to operate along existing paths such as Redmond Way, Leary Way, and 161<sup>st</sup> Avenue NE. Combined travel times for the critical paths between West Lake Sammamish Parkway and the Park-and-Ride lot show a net decrease of 5.6 minutes compared to the No Action Alternative, which translates to a significant improvement in transit mobility with respect to Park-and-Ride access.

### **Non-Motorized Traffic**

Non-motorized travel would be affected positively in Alternative 4 by the new 159<sup>th</sup> Place NE, Bear Creek Parkway, and 161<sup>st</sup> Avenue NE connections. As with Alternatives 1 and 2, a key outcome of these new connections may also be lower traffic volumes on Redmond Way and Cleveland Street. Pedestrian delay would likely be lower, with less overall pedestrian-vehicle friction versus the No Action Alternative. The new roadway connections would also provide an additional north-south non-motorized connection via new sidewalks along the new facilities. Similar benefits to bicyclists could also be realized in terms of reduced friction along Redmond Way and Cleveland Street. Additional volumes on 161<sup>st</sup> Avenue NE due to the north-south connection of the Bear Creek Parkway Extension may impact non-motorized movements crossing 161<sup>st</sup> Avenue NE. However, the benefits of the additional north-south connection on 161<sup>st</sup> Ave would likely outweigh the impacts.

Similar to the No Action Alternative and the Alternative 2 and 3 alignments, the Alternative 4 alignment would not affect the open space and trails west of RTC. It would also provide another pedestrian connection to the BNSF Railroad right-of-way. The amount of space available for non-motorized travel would remain roughly the same as under the No Action Alternative. Overall, Alternative 4 would provide an added dimension of connectivity and greater positive impacts vs. the No Action Alternative.

### **Parking Inventory**

The Alternative 4 alignment would result in greater parking impacts than Alternative 3 and have similar impacts to Alternative 2. Nonetheless, the net impact of Alternative 4 would be modest compared to the overall parking supply in the area under the No Action Alternative. Some on-street parking along segments of both 161<sup>st</sup> Avenue NE and 159<sup>th</sup> Place NE would be removed due to the new alignment and the five-lane width of the Bear Creek Parkway Extension. Due to the loss of these parking spaces, the net impact on the parking supply would be moderately negative.

### **Freight Mobility**

Alternative 4 would benefit freight mobility within the study area, compared to the No Action Alternative. This is primarily due to the creation of a stronger east-west connection provided by the Bear Creek Parkway Extension and a new connection to the north along 161<sup>st</sup> Avenue NE. Freight-related traffic that bypasses the downtown area and uses Redmond Way to/from Kirkland and I-405 would benefit from the new east-west extension. This is confirmed by the analysis results, which indicate lower travel times (versus No Action) along Bear Creek Parkway. Freight movement to/from the downtown core (i.e. local trips) would benefit by added access options along 161<sup>st</sup> Avenue NE and more direct connections to Cleveland Street and Redmond Way. The delay benefits of Alternative 4 and the added level of connectivity would result in a significant positive impact on freight movement.

## Comparison of Alternatives

This section summarizes the comparison of the build alternatives with the 2022 No Action Alternative. Note that while the No Action Alternative is not directly assessed for impacts as part of this environmental analysis, results of the transportation analysis indicates that conditions under the No Action Alternative are considerably worse than existing conditions, and under many standards may be considered unacceptable. For the most part, the build alternatives improve transportation conditions in comparison to the No Action. Table 3.27 compares PM peak-hour volumes between the 2022 No Action Alternative and Alternatives 1 through 4 on selected study area links. Note that in comparison to the No Action Alternative, Alternatives 1, 2 and 4 would attract additional traffic to Bear Creek Parkway and Leary Way, and cause a decrease in traffic volumes along Redmond Way and Cleveland Street. In terms of level of change, Alternative 1 would result in the largest increase in volumes along Bear Creek Parkway and Leary Way. However, this does not result in a correspondingly higher amount of decrease along Redmond Way and Cleveland Street. Alternatives 1, 2, and 4 appear to satisfy one of the primary project objectives in providing an attractive alternative to Redmond Way and Cleveland Street for east-west traffic through downtown. Alternative 3 does not appear to meet this objective, and hence does not result in traffic volumes along these key facilities that are significantly different than the No Action Alternative.

**Table 3.27**  
**Comparison of PM Peak-Hour Volumes**  
**(No Action and Alternatives 1 through 4)**

Link #	Arterial	2002	2022				
		Existing	No Action	Alt 1	Alt 2	Alt 3	Alt 4
1	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (EB)	-	800	775	765	840	775
2	Redmond Way East of 164 <sup>th</sup> Ave. N.E. (WB)	1,397	525	515	520	545	525
3	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (EB)	1,568	510	465	485	495	475
4	Cleveland St. East of 164 <sup>th</sup> Ave. N.E. (WB)	-	310	250	250	345	280
5	Leary Way South of 159 <sup>th</sup> Pl. NE (NB)	1,515	2,750	3,170	2,820	2,780	2,870
6	Leary Way South of 159 <sup>th</sup> Pl. NE (SB)	1,290	1,875	1,930	1,850	1,800	1,940
7	Bear Creek Parkway West of 166 <sup>th</sup> Ave. NE (EB)	624	1,840	2,180	2,110	1,775	2,060
8	Bear Creek Parkway West of 166 <sup>th</sup> Ave. NE (WB)	370	1,075	1,400	1,300	1,065	1,260

In comparing the traffic analysis results (delays and travel times) for the four Bear Creek Parkway Extension alignment alternatives with the No Action Alternative, Alternative 4 would provide the greatest benefit to the transportation system with respect to congestion reduction, non-motorized mobility, and freight movement. This

alternative assumes both east-west and north-south new connections. The Alternative 4 alignment would also result in relatively modest parking impacts and no open space encroachment on the existing recreational trails west of RTC. A comparison of delays and LOS is provided in Table 3.28.

**Table 3.28**  
**Comparison of 2022 Level of Service (LOS) and Delays by Alternative**

		No Action	Alt 1	Alt 2	Alt 3	Alt 4
Node #*	Intersection	Delay/ LOS	Delay/ LOS	Delay/ LOS	Delay/ LOS	Delay/ LOS
29	Redmond & Avondale Way	48.8 D	34.0 C	26.1 C	71.5 E	21.9 C
40	Redmond & 164 <sup>th</sup> Ave NE	52.7 D	38.6 D	48.4 D	58.3 E	37.4 D
59	W. Lake Sammamish Pkwy & Leary Way	50.9 D	54.3 D	65.3 E	77.7 E	62.1 E
60	159 <sup>th</sup> PI NE/Leary Way (BCP Ext)	21.4 C	70.6 E	14.7 B	34.0 C	16.2 B
74	Redmond & Leary Way	72.5 E	50.3 D	50.7 D	50.1 D	28.9 C
75	Redmond & 161 <sup>st</sup> Ave NE	55.1 E	20.7 C	18.4 B	30.4 C	32.6 C
76	Redmond & 160 <sup>th</sup> Ave NE	33.6 C	30.2 C	29.4 C	37.8 D	29.4 C
188	Redmond & 159 <sup>th</sup> Place NE	39.9 D	36.9 D	40.4 D	53.4 D	22.5 C
197	Redmond & 170 <sup>th</sup> Ave NE	75.6 E	56.1 E	56.9 E	88.3 F	54.7 D
200	BCP & Leary Way	26.8 C	45.3 D	43.9 D	62.2 E	32.7 C
*Note: Node numbers refer to intersection numbers as reflected in the Synchro simulation model network.						

As shown in Table 3.28, delays for Alternative 4 would be generally lower than Alternatives 1 through 3 for the ten key intersections listed. The primary exception is at West Lake Sammamish Parkway and Leary Way, where delays would be comparable to Alternative 2 but lower than Alternative 3. The Alternative 1 delays at this intersection would be lower due to the (relatively) lower peak-hour volumes on Leary Way for Alternative 1 (i.e., the alignments for Alternatives 2 and 4 attract more trips).

The No Action Alternative shows the lowest delays for the West Lake Sammamish Parkway/Leary Way intersection due to the fact that trips along West Lake Sammamish Parkway and Leary Way would be the lowest of the various options. Nonetheless, the results show that the additional connections for east-west and north-south access provided in Alternative 4 could result in some dilution of traffic through the downtown area. This would reduce overall congestion levels, especially during the critical PM peak-hour period.

A comparison of travel time data for the various alternatives shows that Alternative 4 would result in the lowest travel times due to the combination of additional east-west and north-south connections. The lack of a strong east-west connection for Alternative 3

would result in the longest travel times. For north-south paths along Leary Way and 161<sup>st</sup> Avenue NE or 164<sup>th</sup> Avenue NE, the results show a reduction in travel times for Alternatives 3 and 4, which both add a new north-south arterial connection via the Bear Creek Parkway extension and 161<sup>st</sup> Avenue NE. Note that the specific travel paths for these two alternatives reflect use of the new 161<sup>st</sup> Avenue NE connections in the travel time calculations. Table 3.29 compares travel times for the eight primary paths.

**Table 3.29**  
**Comparison of 2022 Travel Times by Alternative**

<b>Travel Path</b>	<b>No Action</b>	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
1 – Redmond Way EB	12.2 min	9.3 min	9.3 min	8.2 min	7.3 min
2 – Redmond Way WB	9.5 min	6.7 min	7.0 min	14.1 min	6.0 min
3 – Cleveland Street EB	8.4 min	7.7 min	8.1 min	8.3 min	7.2 min
4 – Cleveland Street WB	10.6 min	7.8 min	8.8 min	18.8 min	8.7 min
5 – BCP & Leary Way EB	5.2 min	4.6 min	5.8 min	6.4 min	5.4 min
6 – BCP & Leary Way WB	6.3 min	5.5 min	4.7 min	9.5 min	5.9 min
7 – W Lake Sammamish Pkwy to NE 90 <sup>th</sup> St NB	7.3 min	9.8 min	7.8 min	6.5 min	6.1 min
8 – NE 90 <sup>th</sup> St to W Lake Sammamish Pkwy	10.0 min	9.8 min	10.6 min	6.9 min	6.3 min

In terms of the additional comparison criteria, Alternative 4 would also have fewer impacts compared to the other alternatives. For non-motorized impacts, Alternative 4's major benefits would be shorter crossing distances across Redmond Way and Cleveland Street, reduced traffic in the downtown core (Redmond/Cleveland), and reduced friction for bicyclists on key routes. Alternative 4 would also provide an additional north-south route for non-motorized travelers and (similar to Alternatives 2 and 3) avoid the open space area west of RTC, thereby preserving the existing trail system along the riverfront.

Transit routes could also benefit from the Alternative 4 alignment, based on the flexibility that the east-west and north-south connections would provide as opposed to a more linear connection strategy in the other alternatives. With reduced congestion in the downtown core (as shown by the traffic analysis results), transit vehicles would experience less delay, thereby improving on-time reliability and reducing travel times for patrons.

Alternative 4 would also provide better flexibility for freight-related movements to access local destinations, and would provide better regional mobility than the other alternatives. With the north-south connection to 161<sup>st</sup> Avenue NE, freight deliveries to and from areas north of Redmond Way along 160<sup>th</sup> Avenue NE or 161<sup>st</sup> Avenue NE could avoid congestion along Leary Way near Cleveland Street and Redmond Way. The east-west connection would reduce travel times compared to the No Action Alternative.

Construction impacts of the various alternatives would vary noticeably depending on the specific alternative in question. With the Alternative 1 alignment (which assumes use of 159<sup>th</sup> Place NE west of Leary Way as part of the Bear Creek Parkway extension), traffic impacts would be greatest due to the widening of 159<sup>th</sup> Place NE and disruption of east-west traffic during construction (no alternative routes to 159<sup>th</sup>

Place NE would likely be provided). Potential open space/environmental impacts and property acquisition for Alternative 1 would also be significant due to the amount of land needed along the riverfront to connect to 159<sup>th</sup> Place NE/Leary Way. Recreation trails along the river would also be most impacted by Alternative 1.

Alternative 4 would result in fewer construction impacts, primarily due to the reduced level of traffic disruption compared to Alternative 1. Traffic flow could generally be maintained during construction for Alternative 4 on existing roadways, and then redirected when the proposed arterial connections are finally completed. Alternative 4 would also avoid the property along the Sammamish River and preserve the related recreational trails and open space. However, the alignment of the north-south connection in Alternative 4 (along 161<sup>st</sup> Avenue NE) would require acquisition of some businesses. Alternatives 2 and 3 would result in the third and fourth lowest construction impacts respectively, in terms of traffic flow and open space. This is due to the configuration of these two alignments, which could allow construction activity to occur without disrupting existing streets (they include new sections of roadway). The majority of the roadway construction phases could occur independently until the final connection(s) to existing streets are made.

### ***Mitigation Measures***

As discussed in previous sections, the various alignment alternatives for the Bear Creek Parkway Extension assume either an east-west connection between Bear Creek Parkway and Redmond Way or a north-south connection from Bear Creek Parkway to 161<sup>st</sup> Avenue NE, or some combination of the two. As part of these new arterial connections, capacity enhancements are inherently incorporated into the roadway configurations to ensure that sufficient throughput capacity is provided for additional traffic loads along the new routes. Similar measures are applied to the two-way Redmond Way and Cleveland Street arterials (converted from a couplet) in terms of potential left-turn channelization and/or signal phasing provisions to ensure minimal impacts to intersection and arterial capacity.

Based on these assumed roadway and signal enhancements for the project alternatives, no significant mitigation measures would be required to maintain or improve traffic circulation in the downtown area with any of the alternatives when fully implemented.

However, during construction phasing a traffic diversion and mitigation program would be required to provide guidance and notification of detour routes and roadway closures. Mitigation elements would include warning lights, barricades, signs, steel plates and temporary fencing. These elements should be installed at detour points, roadway hazards, and sidewalks to ensure appropriate safety for pedestrians, bicyclists, and motorists. Personnel would also be assigned to specific hazard areas (particularly during peak traffic periods) to direct traffic around and through construction zones and maintain reasonable arterial progression. Emergency routes for police and fire personnel would be provided through construction areas at all times and transit vehicle access to bus zones would be provided.

### ***Significant Unavoidable Adverse Impacts***

Due to the various traffic/capacity measures incorporated into each of the Bear Creek Parkway Extension alternatives (1, 2, 3, and 4), the resulting long-term (2022) congestion levels and circulation characteristics are deemed reasonable from a traffic-flow perspective. As mentioned in the preceding *Mitigation Measures* section, the roadway configurations for the four alternatives would include several channelization

and signal enhancements, in addition to conversion of the Redmond Way/Cleveland Street couplet into two-way streets. Due to these improvements, no significant unavoidable impacts to the transportation system would likely occur by the Year 2022 horizon. In fact, overall system congestion levels would generally improve for the four alternatives compared to No Action Alternative, and similar improvements would likely occur for non-motorized traffic and freight mobility. Although a portion of the parking supply would be eliminated by the Redmond Way conversion to a two-way street, the magnitude of this impact would be considered modest.

Unavoidable impacts would only be realized during construction. These could be mitigated through the measures identified in the previous section. However, some increase in congestion would be unavoidable for all build alternatives during construction.

## **Public Services and Utilities**

### ***Affected Environment***

A number of urban services and utilities are provided in or near the proposed project area. A general description of these services and utilities, as identified in Redmond GIS files and the RCP, are discussed in this section. Identification of impacts is based on conceptual design only. Additional coordination with the City Public Works Department and other utility providers will occur during the design phase. As-built plans for utilities will be obtained and consideration of utilities will be incorporated into the design and construction of the project.

#### **Services**

##### **Fire**

The Redmond Fire Department provides fire and emergency medical services for the City of Redmond. The Department has six stations and a total of 106 employees. The Department also has mutual aid agreements with adjacent jurisdictions. The closest station to the Bear Creek Parkway project area is Station 11, located near the NE 85th Street/161st Avenue NE intersection approximately one-half mile north of the project area.

##### **Police**

The Redmond Police Department provides police services in the City. The Police Department is located at 8701 160th Avenue NE, less than one mile north of the project area. The Department provides patrol services and traffic, parking, enforcement and crime prevention services throughout the city. The Department also participates in mutual aid agreements with adjacent jurisdictions.

##### **Schools**

Redmond is served by the Lake Washington School District, which has 48 schools and over 23,500 employees. The District includes K-12 schools, as well as alternative schools and programs. Redmond Elementary School, located at 16800 NE 80th Street, is near the project area.

#### **Utilities**

The City of Redmond provides water, sewer, and stormwater drainage services to the project area. Numerous water, sewer, and stormwater pipelines are located within streets in the project area. Puget Sound Energy provides electricity and